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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/582,272

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EXAMINER

LEE, REBECCA Y

ART UNIT

PAPER NUMBER

1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/582,272	Applicant(s) ZHAO ET AL.	
	Examiner REBECCA LEE	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/09/06, 03/28/07</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Status of Claims

Claims 2-3 are canceled; claim 7 is newly added in view of the preliminary amendment filed 06/09/06. Claims 1 and 4-7 are pending where claims 1, 4-6 are amended.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuramoto et al. (JP10110232) in view of Matsuo et al. (JP 62207851).

Regarding claim 1, Kuramoro et al. teach a method of producing aluminum alloy sheets comprising casting, which includes twin-belt casting, an alloy melt with a composition relative to that of the instant invention, in weight percent, as shown below (abstract):

Element	Instant claim	Kuramoto et al.	Overlap
Mg	0.30-1.00	0.2-3.0	0.3-1.0
Si	0.30-1.20	0.2-3.0	0.3-1.2
Fe	0.05-0.50	0-1.0	0.05-0.5
Mn	0.05-0.50	0.01-0.5	0.05-0.5
Ti	0.005-0.10	0.001-0.5	0.005-0.1
Cu	0.05-0.70	0-2.5	0.05-0.70
Zr	0.05-0.40	0.01-0.5	0.05-0.4
Al and unavoidable	balance	balance	balance

impurities			
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The amounts of Mg, Si, Fe, Mn, Ti, Cu, Zr and Al disclosed by Kuramoro et al. overlaps the claimed amounts of Mg, Si, Fe, Mn, Ti, Cu, Zr and Al, which is prima facie evidence of obviousness MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to have selected the claimed amounts of Mg, Si, Fe, Mn, Ti, Cu, Zr and Al from the amounts disclosed by Kuramoro et al. since Kuramoro et al. disclose the same utility throughout the disclosed ranges.

Kuramoto et al. further teach the process of producing aluminum alloy sheets further comprising the following steps after casting:

winding into a coil (section 0010);

subjecting to a homogenization treatment at a temperature of 580°C or less for a period of 2 to 24 hours; the heating rate and cooling rate is 30-100°C/hour (section 0010 and claim 6);

cold rolling (section 0010) followed by solution treatment at a temperature greater than 400°C (section 0017).

Kuramoto et al. further teach continuous annealing furnace would be use for heating the aluminum alloy (section 0019), it would have been obvious to one of ordinary skill in the art to use continuous annealing furnace to heat the slab (in a continuous annealing line) with expected success.

Even though Kuramoto et al. do not expressly teach the coil is cooled to 250°C or less at a cooling rate of at least 500°C/h after the homogenization treatment, and prior to the cold rolling; Kuramoto et al. disclose rapid cooling is preferred after the

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homogenization treatment (section 0016). It would have been obvious to one of ordinary skill in the art to apply high cooling rate as claimed in Kuramoto et al.'s process in order to fully demonstrate the effect of subsequent solution treatment (section 0016).

Kuramoto et al. do not expressly teach the casting is carried out at a cooling rate of 40-150°C/s at a quarter-thickness of the slab to form a slab of 5-15mm before winding into a coil, nor teach the solution treatment is carried out by heating at a heating rate of at least 10°C/s and holding for 30 seconds or less.

Matsuo et al. teach a similar method of producing aluminum alloy sheets, where the casting of aluminum alloy is carried out at a cooling rate of 100°C or greater and forms a 3-15 mm thick slab (Page 11, lines 4-19).

It is well held that discovering an optimum value of a result-effective variable requires only routine skill in the art MPEP 2144.05 II. In the instant case, cooling rate is a result effective variable since it would affect the properties of the alloy, such as formability, elongation, bending properties and stretchability, as evidenced by Matsuo et al. (Page 11, lines 7-12). Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the cooling rate of Kuramoto et al. in order to achieve an alloy with desired properties.

Matsuo et al. further teach a solid annealing treatment (solution treatment) is conducted after cold rolling in a continuous heating furnace. The solution treatment is conducted by heating the Al-Mg-Si alloy to 470-600°C with rapid heating (page 12, lines 3-14).

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It is well held that discovering an optimum value of a result-effective variable requires only routine skill in the art MPEP 2144.05 II. In the instant case, heating rate and heating time is a result effective variable since it would affect the crystalline structures and properties of the alloy, such as the maximum size of the intermetallic compound, tensile strength, elongation and etc., as evidenced by Matsuo et al. (Page 12, lines 4-14 and Tables 2-3). Tables 2-3 in Matsuo et al. show that the structures and properties of the alloy depend on the heating rate and heating time of the solution treatment. Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the heating rate and heating time of Kuramoto et al. in order to achieve an alloy with desired structure and properties.

Regarding claim 4, Kuramoto et al. disclose the coil is quenched to below 175°C at a cooling rate more than 2°C/s (section 0018); followed by a restoration treatment by holding for 0-25 mins at 180-320°C in a continuous annealing furnace (section 0019). Then the aluminum alloy sheets are cooled radiationally to room temperature (section 0019). Thus, the cooling and restoration treatment conditions as taught by Kuramoto et al. overlap the claimed ranges MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art to expect the aluminum alloy is quenched at a similar cooling rate as claimed absence evidence to the contrary.

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Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuramoto et al. (JP10110232) in view of Matsuo et al. (JP 62207851) as applied to claim 1 above, and further in view of Jin et al (US 5616189).

Regarding claims 5-6, the combined references teach the aluminum sheets are quenched after solution treatment, followed by a restoration process (see rejection above), and then subjected to aging treatment (Kuramoto et al. section 0003); but do not expressly teach the quenching process with claimed temperature and cooling rates.

Jin et al. disclose a quenching process of aluminum alloy sheet after solution treatment comprising: cooling to 220°C at a rate faster than 10°C, cooling to between 120 and 50°C at a rate greater than 1°C and coiling the sheet to ambient temperature (room temperature) (Column 8, lines 50-65). Jin et al. further teach the quenching process involve forced cooling the sheet by means of water cooling and air cooling (Column 8, lines 66-67 and Column 9, lines 1-6).

It would have been obvious to one of ordinary skill in the art to incorporate the quenching process of Jin et al. into the process taught by the combined references in order to obtain a desirable product with good storage qualities as taught by Jin et al. (Column 9, lines 32-38).

Regarding claim 7, the combined references do not expressly teach the unwinding step (prior to cold rolling).

Jin et al. teach the coil is unwound, then subjected to cold rolling (Column 9, lines 39-54); it would have been obvious to one of ordinary skill in the art to expect the coil is forcibly cooled before cold rolling.

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It would have been obvious to one of ordinary skill in the art to incorporate the unwinding process of Jin et al. into the process taught by the combined references in order to obtain a desirable product with good storage qualities as taught by Jin et al. (Column 9, lines 32-38).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 20030133825 discloses the conventionally twin belt casting.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to REBECCA LEE whose telephone number is (571)270-5856. The examiner can normally be reached on Monday-Friday 8:00 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ROY KING can be reached on (571)272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. L./
Examiner, Art Unit 1793

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793